FIG.1

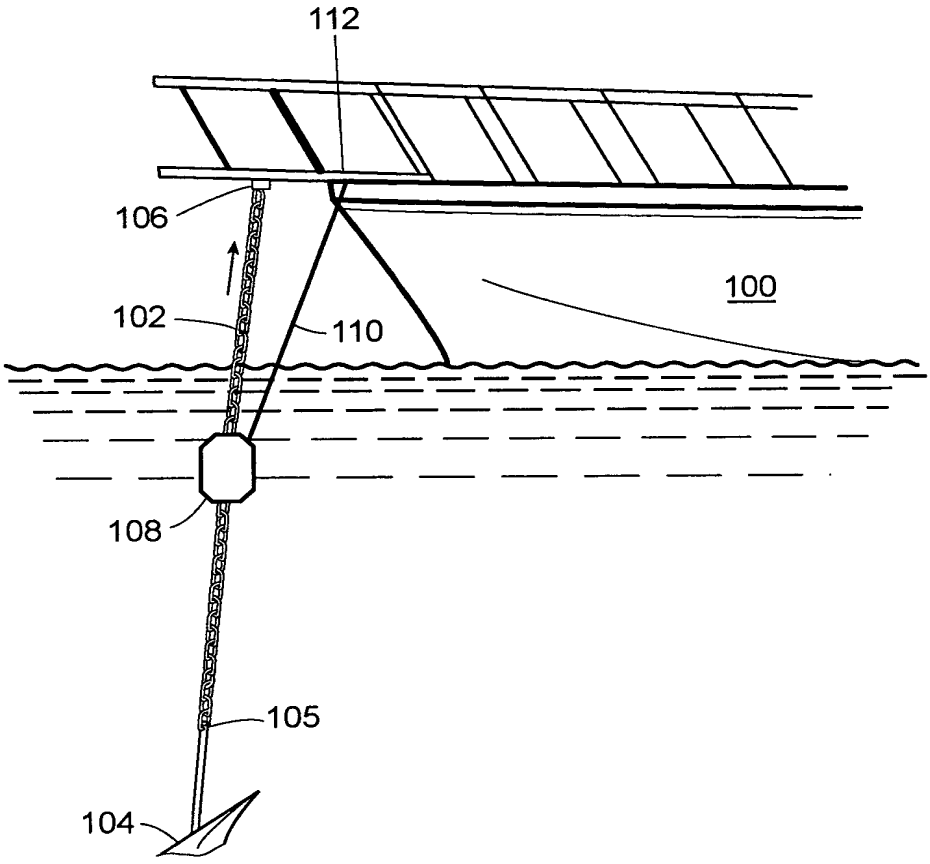


FIG. 2

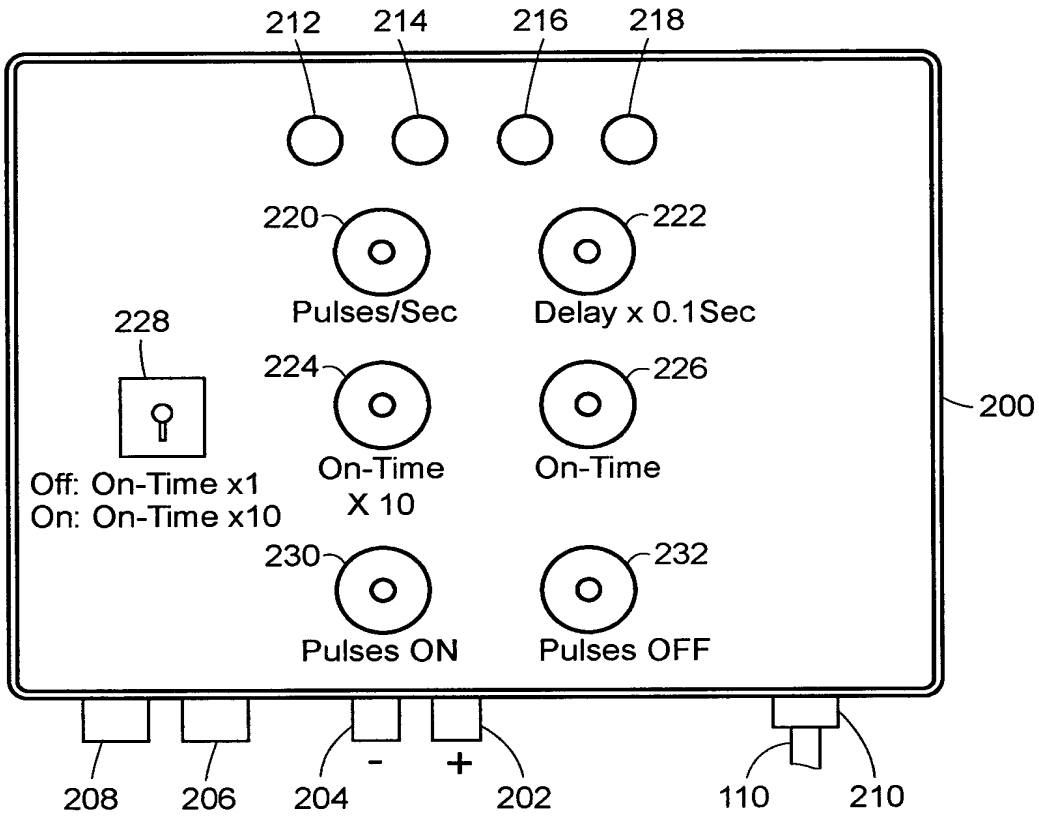

212
214
216
218
220
Pulses/Sec
222
Delay x 0.1Sec
228
224
On-Time
X 10
226
On-Time
200
Off: On-Time x1
On: On-Time x10
230
Pulses ON
232
Pulses OFF
208
206
204
-
+
202
110
210

FIG. 3

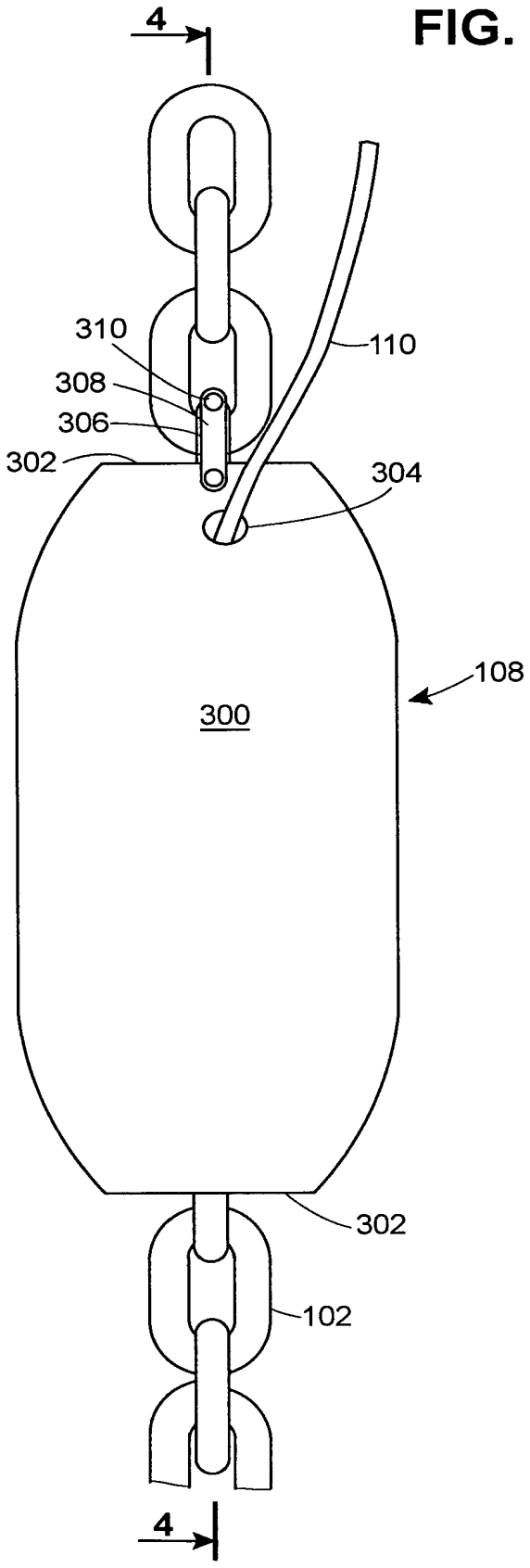


FIG. 4

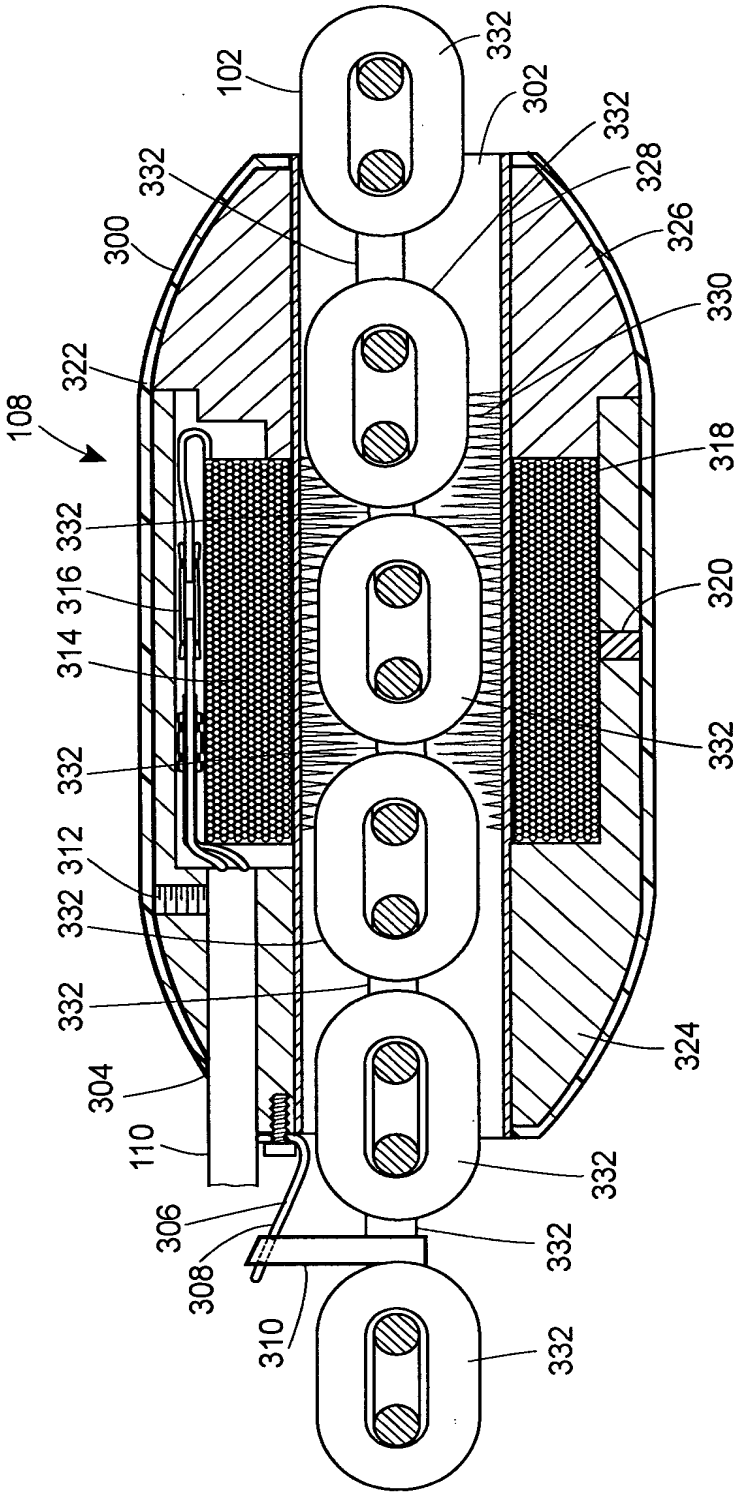

102
332
302
332
328
326
330
332
300
322
108
318
332
316
314
320
332
332
312
332
332
324
304
110
332
306
332
308
310
332

FIG. 5

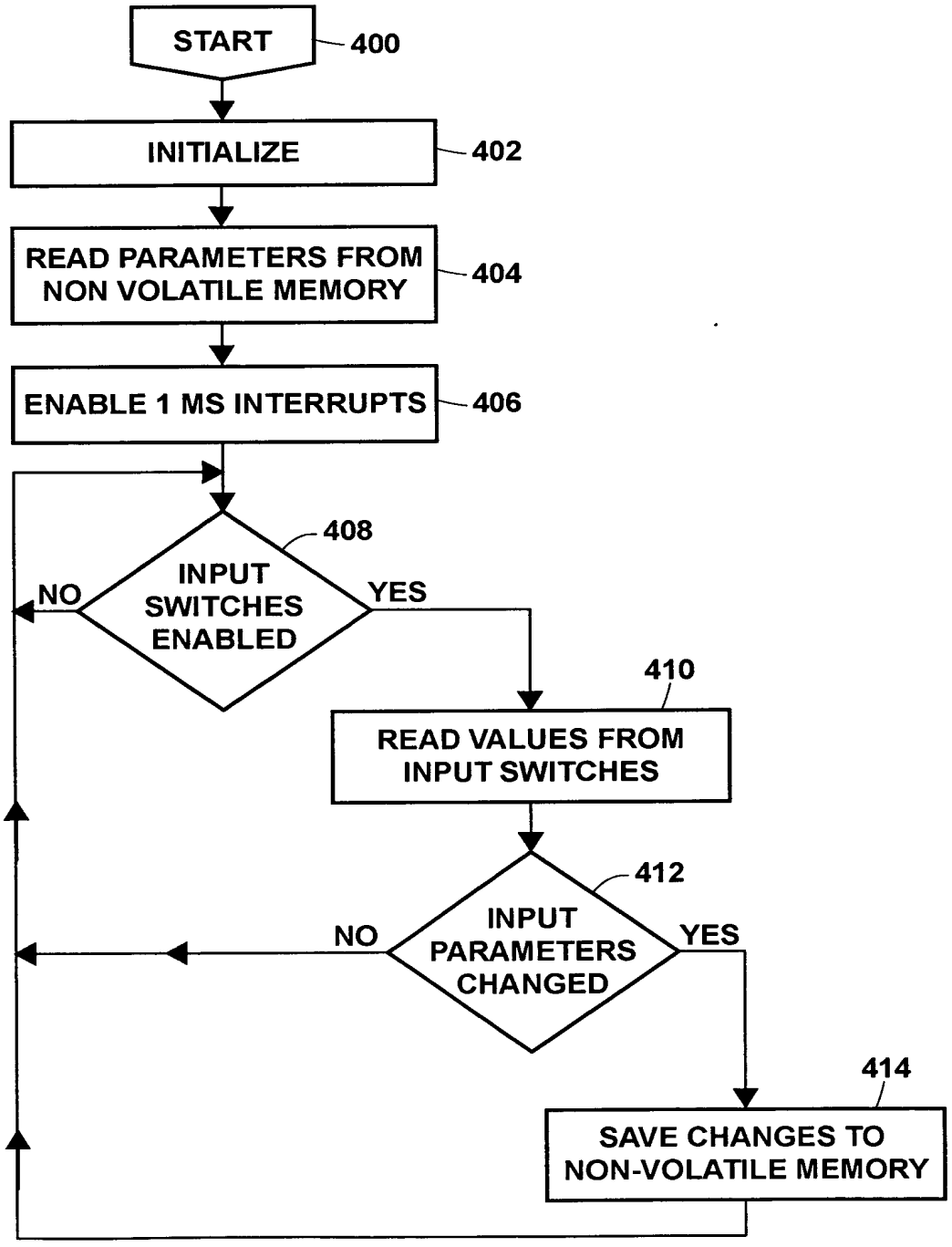

START
400
INITIALIZE
402
READ PARAMETERS FROM NON VOLATILE MEMORY
404
ENABLE 1 MS INTERRUPTS
406
408
INPUT SWITCHES ENABLED
NO
YES
410
READ VALUES FROM INPUT SWITCHES
412
INPUT PARAMETERS CHANGED
NO
YES
414
SAVE CHANGES TO NON-VOLATILE MEMORY

FIG. 6A

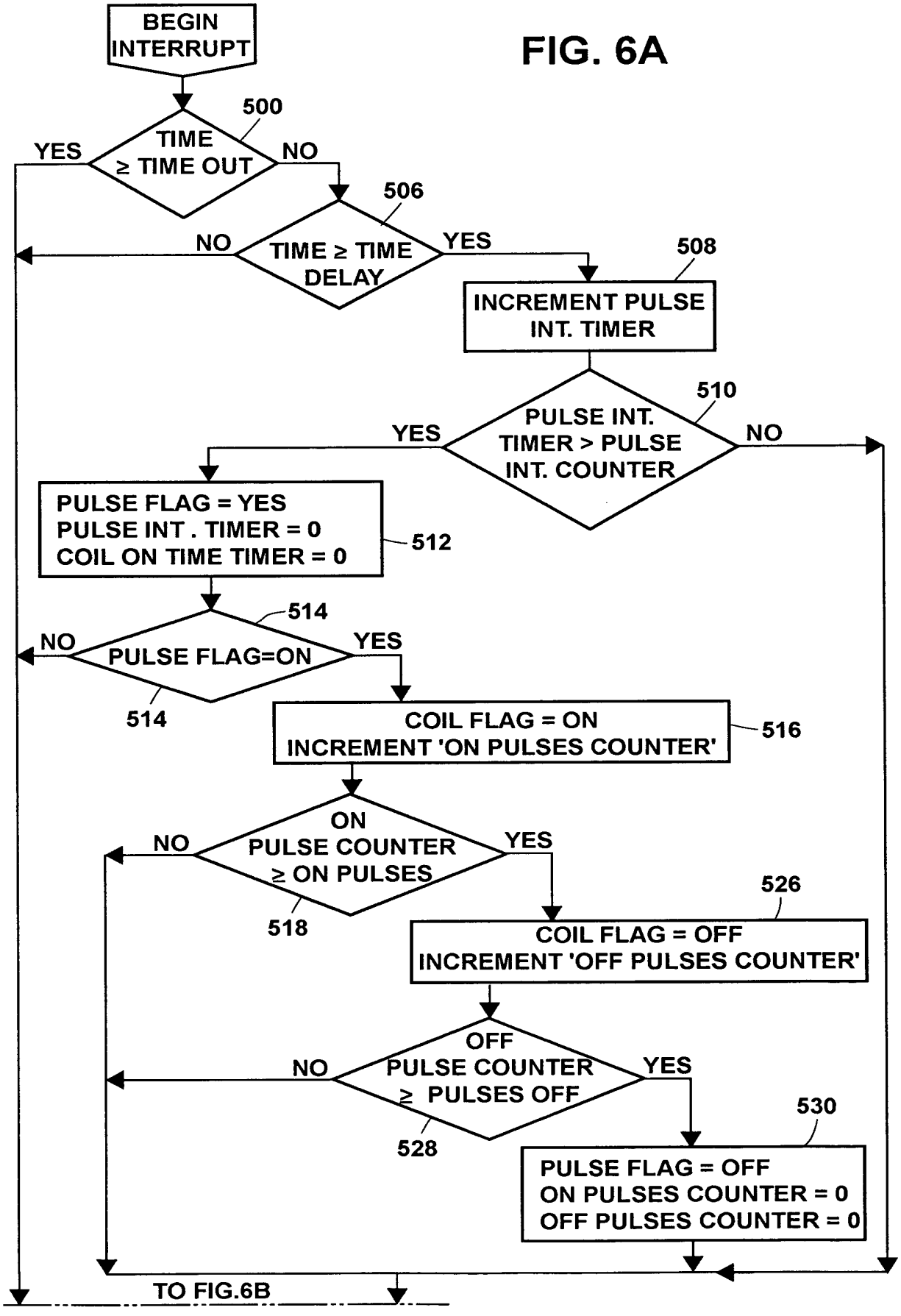

BEGIN INTERRUPT
500
TIME ≥ TIME OUT
YES
NO
506
TIME ≥ TIME DELAY
NO
YES
508
INCREMENT PULSE INT. TIMER
510
PULSE INT. TIMER > PULSE INT. COUNTER
YES
NO
PULSE FLAG = YES
PULSE INT . TIMER = 0
COIL ON TIME TIMER = 0
512
514
PULSE FLAG=ON
NO
YES
514
COIL FLAG = ON
INCREMENT 'ON PULSES COUNTER'
516
ON PULSE COUNTER ≥ ON PULSES
NO
YES
518
526
COIL FLAG = OFF
INCREMENT 'OFF PULSES COUNTER'
OFF PULSE COUNTER ≥ PULSES OFF
NO
YES
528
530
PULSE FLAG = OFF
ON PULSES COUNTER = 0
OFF PULSES COUNTER = 0
TO FIG.6B

FIG. 6B

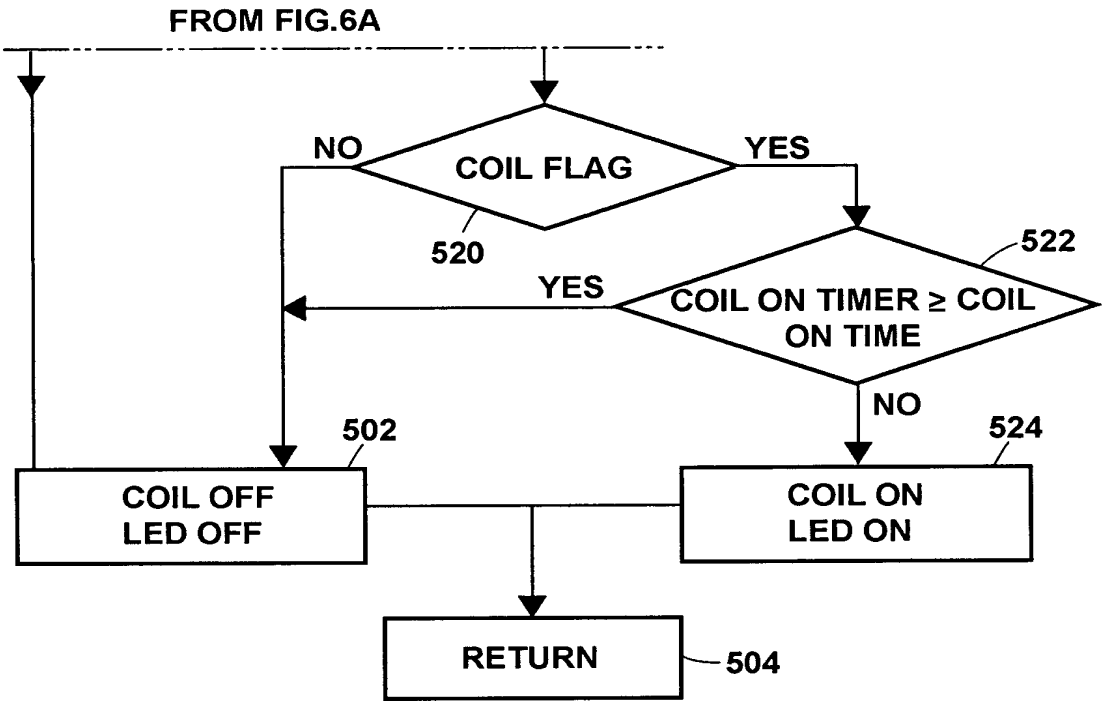

FROM FIG.6A
NO
COIL FLAG
YES
520
522
YES
COIL ON TIMER ≥ COIL ON TIME
NO
502
524
COIL OFF
LED OFF
COIL ON
LED ON
RETURN
504

FIG. 7

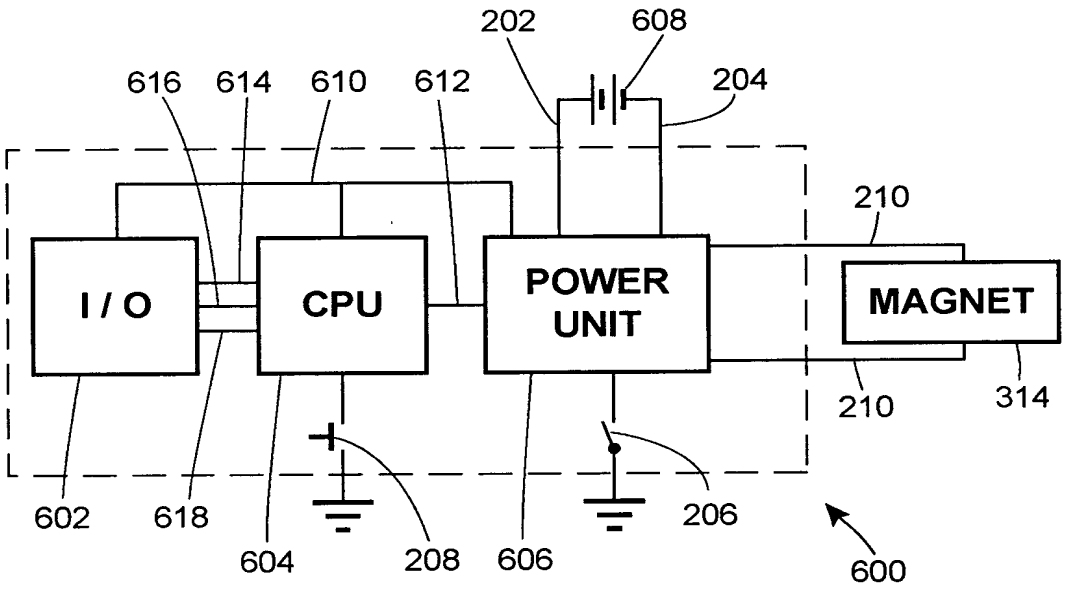

202
608
616
614
610
612
204
210
I / O
CPU
POWER UNIT
MAGNET
210
314
602
618
604
208
606
206
600

FIG. 7A

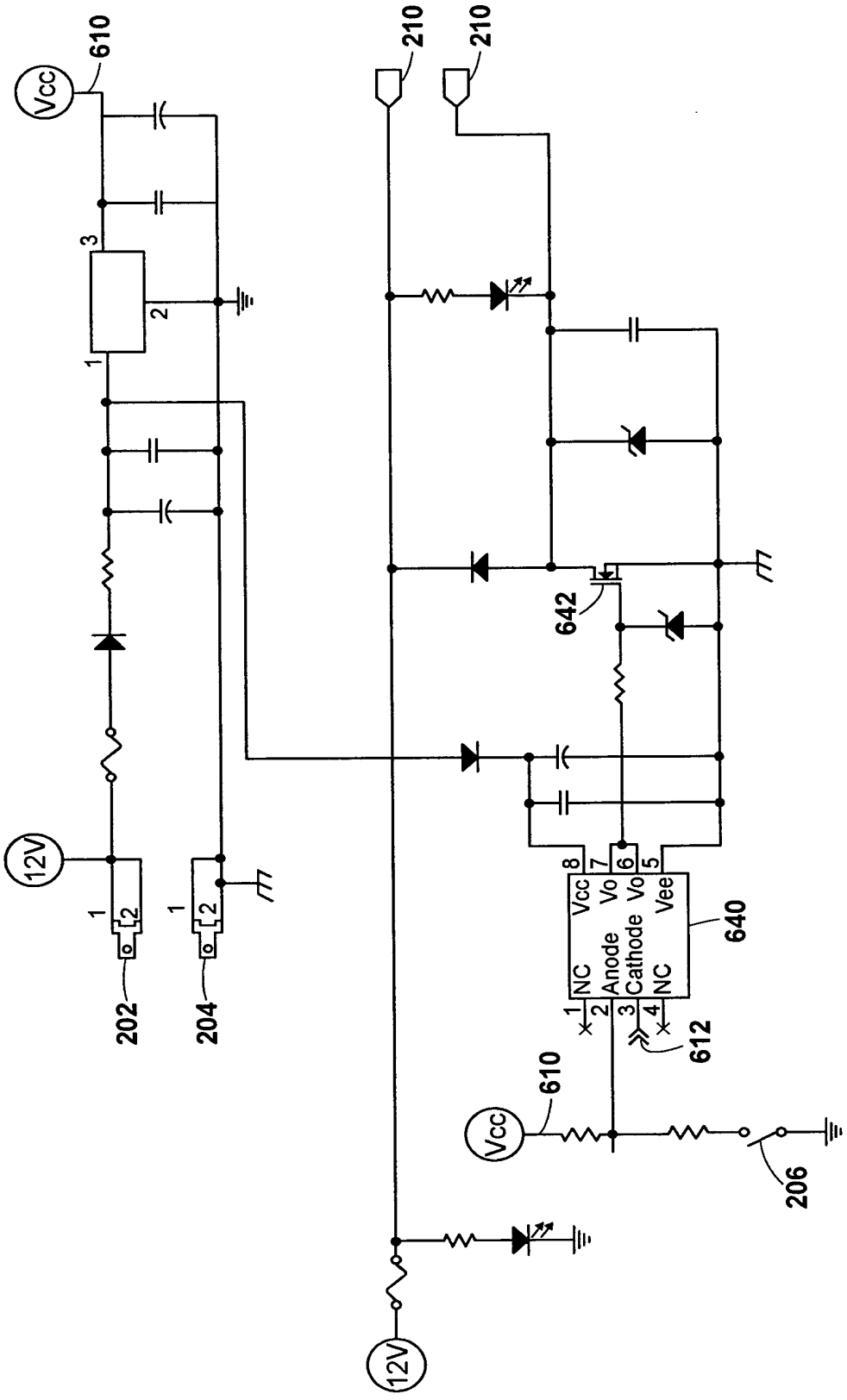

Vcc
610
210
210
3
2
1
642
12V
1
2
202
204
8
7
6
5
Vcc
Vo
Vo
Vee
NC
Anode
Cathode
NC
640
1
2
3
4
612
610
Vcc
206
12V

FIG. 7B

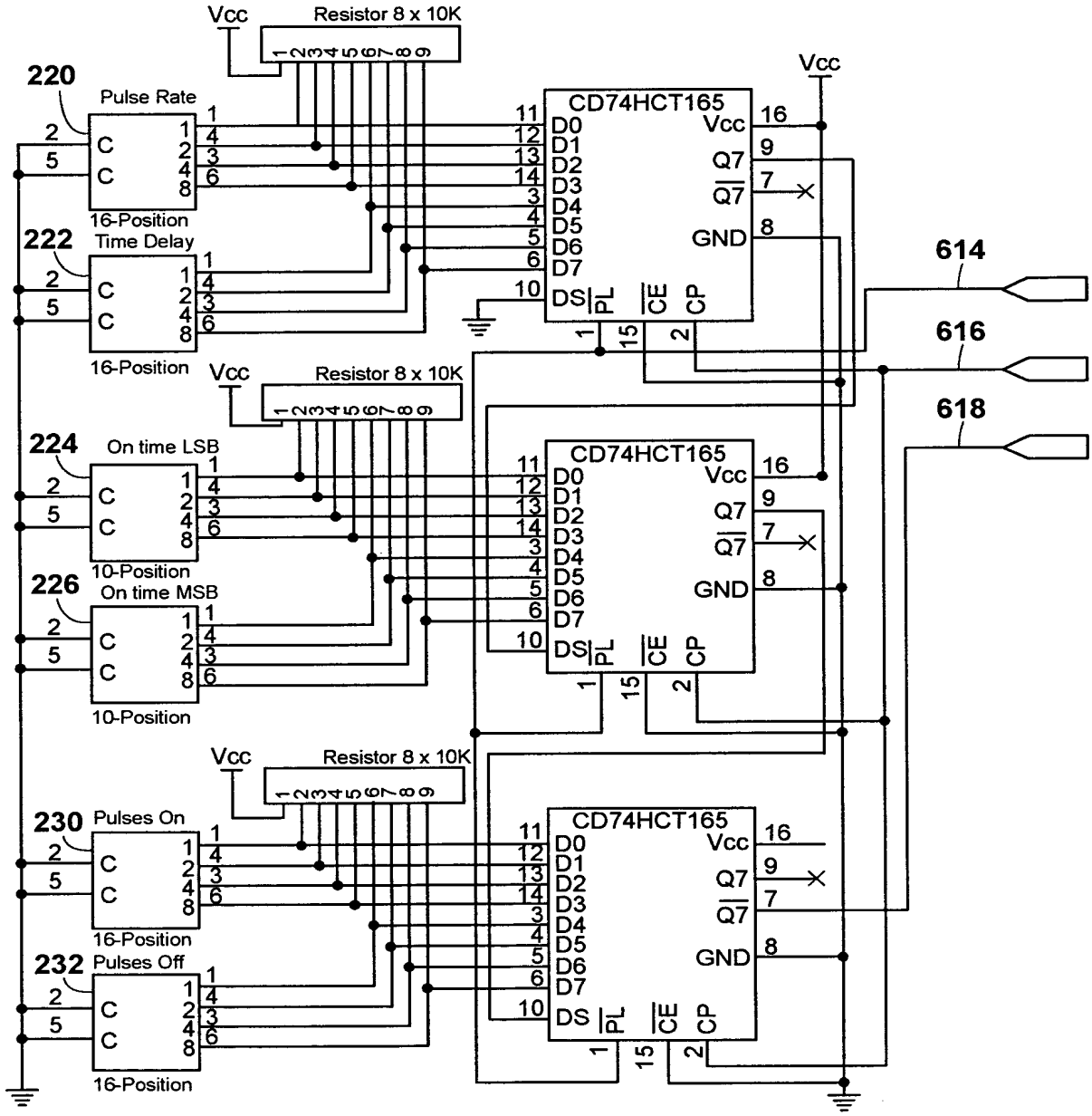

Vcc
Resistor 8 x 10K
220
Pulse Rate
16-Position
222
Time Delay
16-Position
224
On time LSB
10-Position
226
On time MSB
10-Position
230
Pulses On
16-Position
232
Pulses Off
16-Position
CD74HCT165
D0
D1
D2
D3
D4
D5
D6
D7
DS
PL
CE
CP
Q7
GND
614
616
618

FIG. 7C

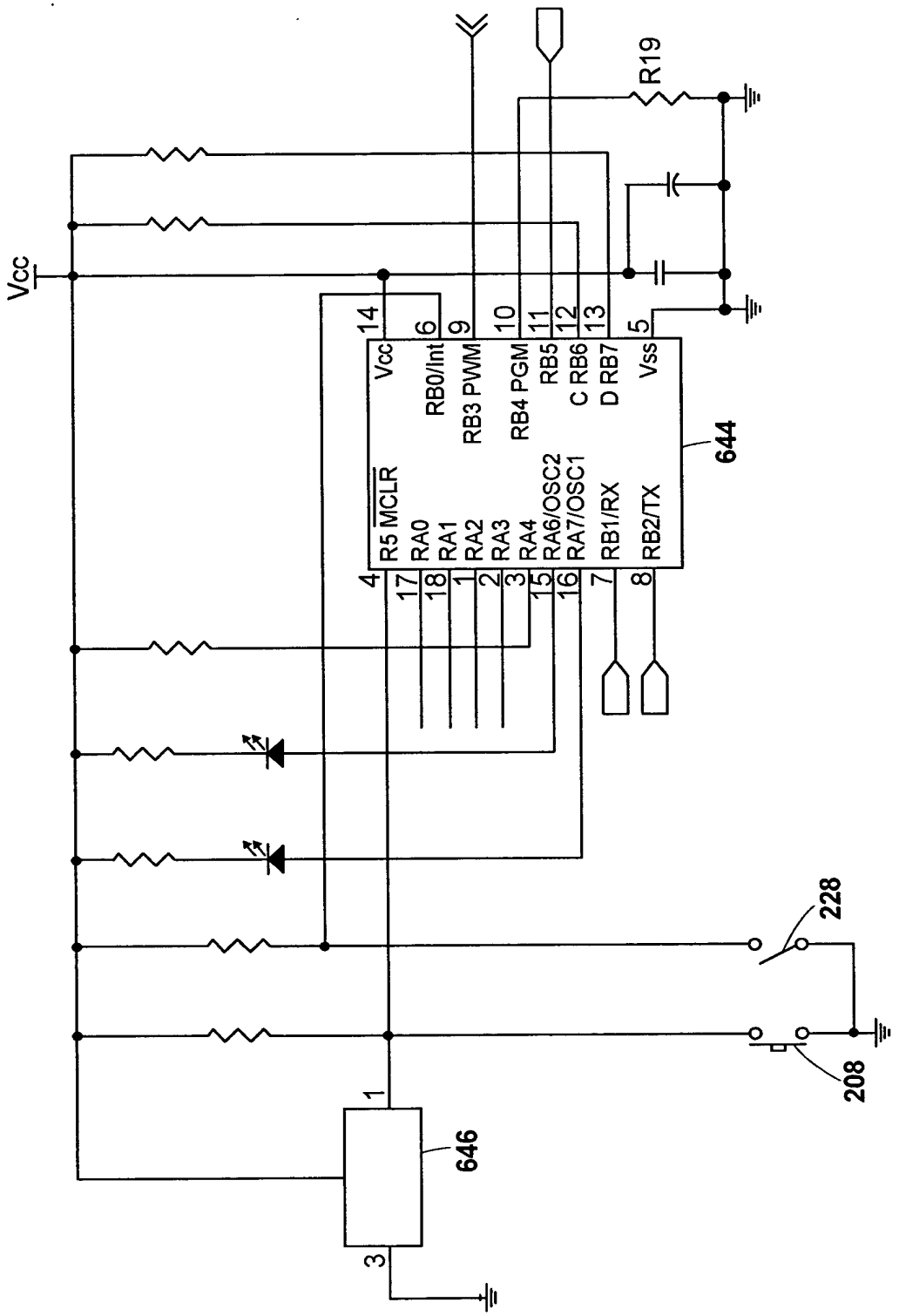

R19
Vcc
14
6
9
10
11
12
13
5
Vcc
RB0/Int
RB3 PWM
RB4 PGM
RB5
C RB6
D RB7
Vss
644
R5 MCLR
RA0
RA1
RA2
RA3
RA4
RA6/OSC2
RA7/OSC1
RB1/RX
RB2/TX
4
17
18
1
2
3
15
16
7
8
228
208
1
646
3

FIG. 8

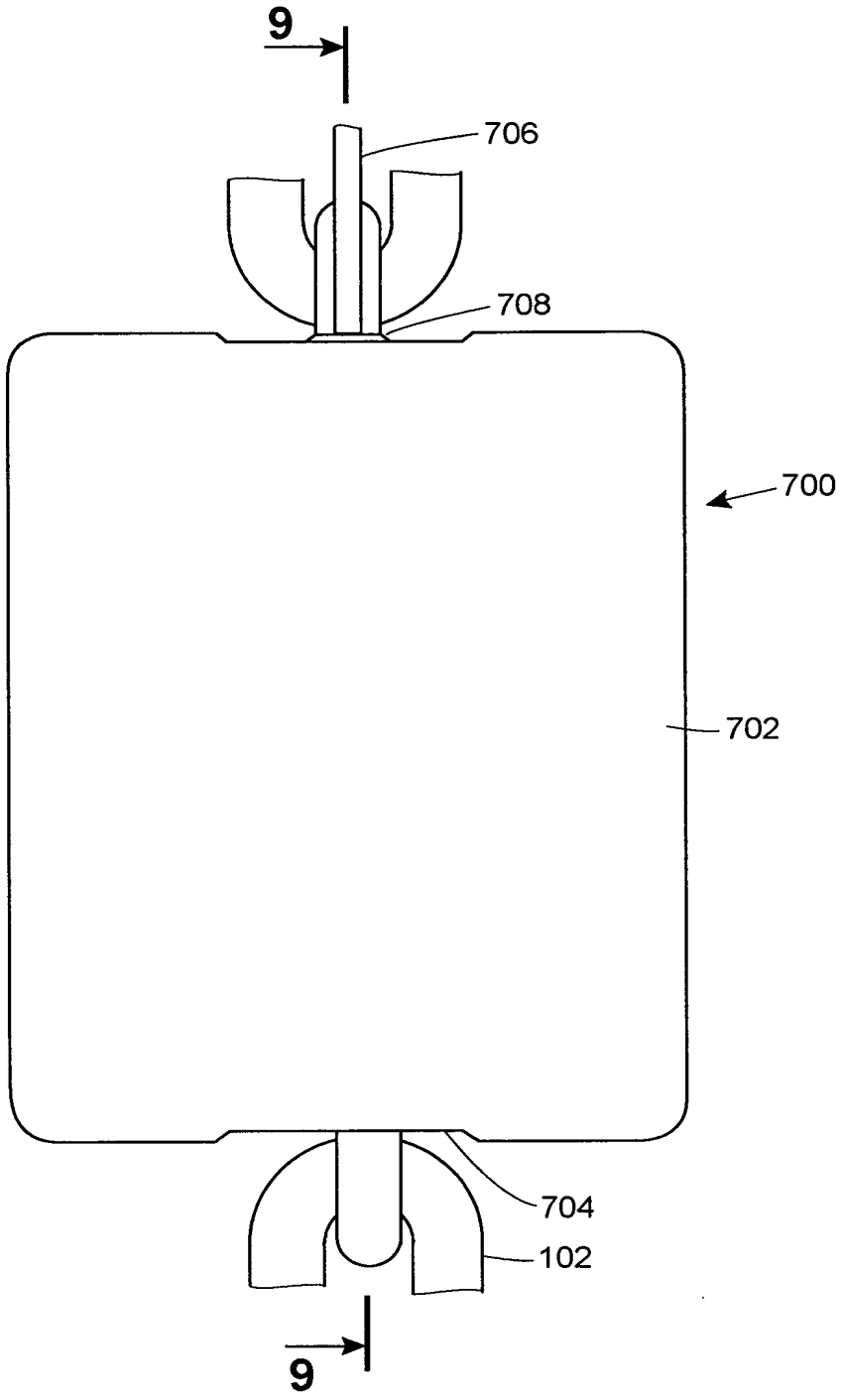


FIG. 9

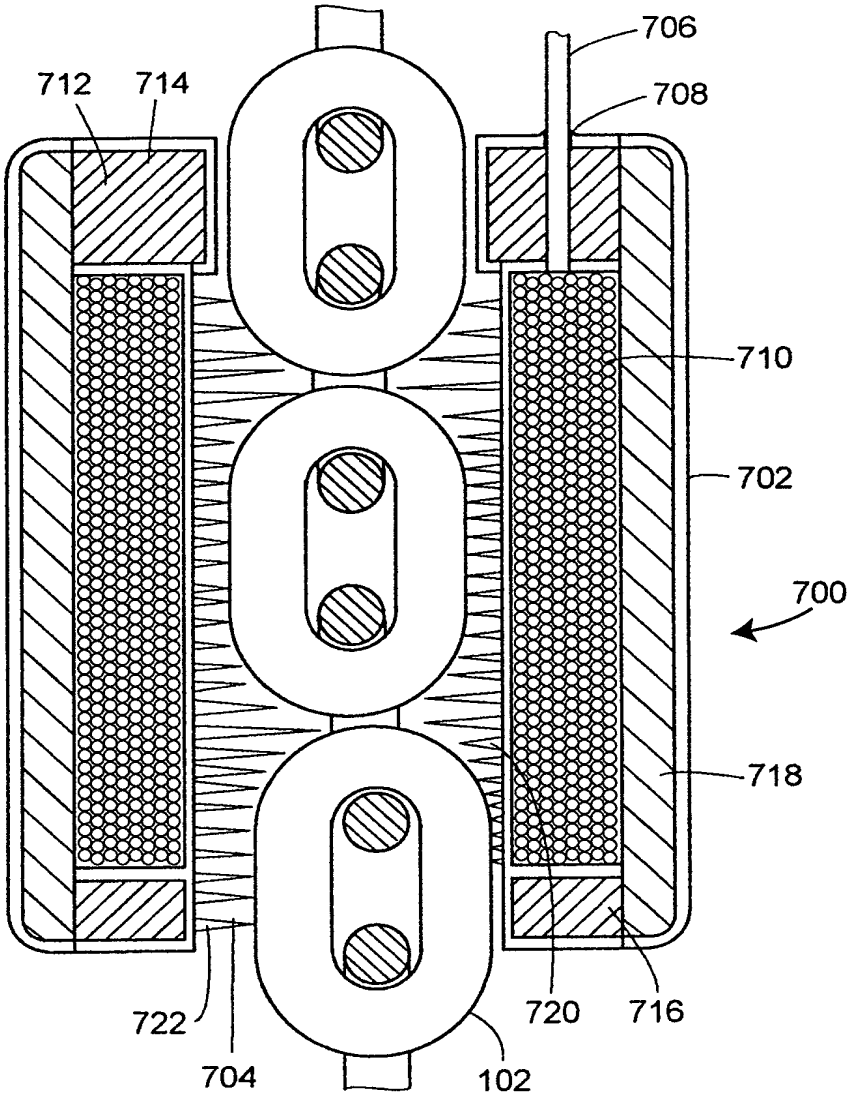
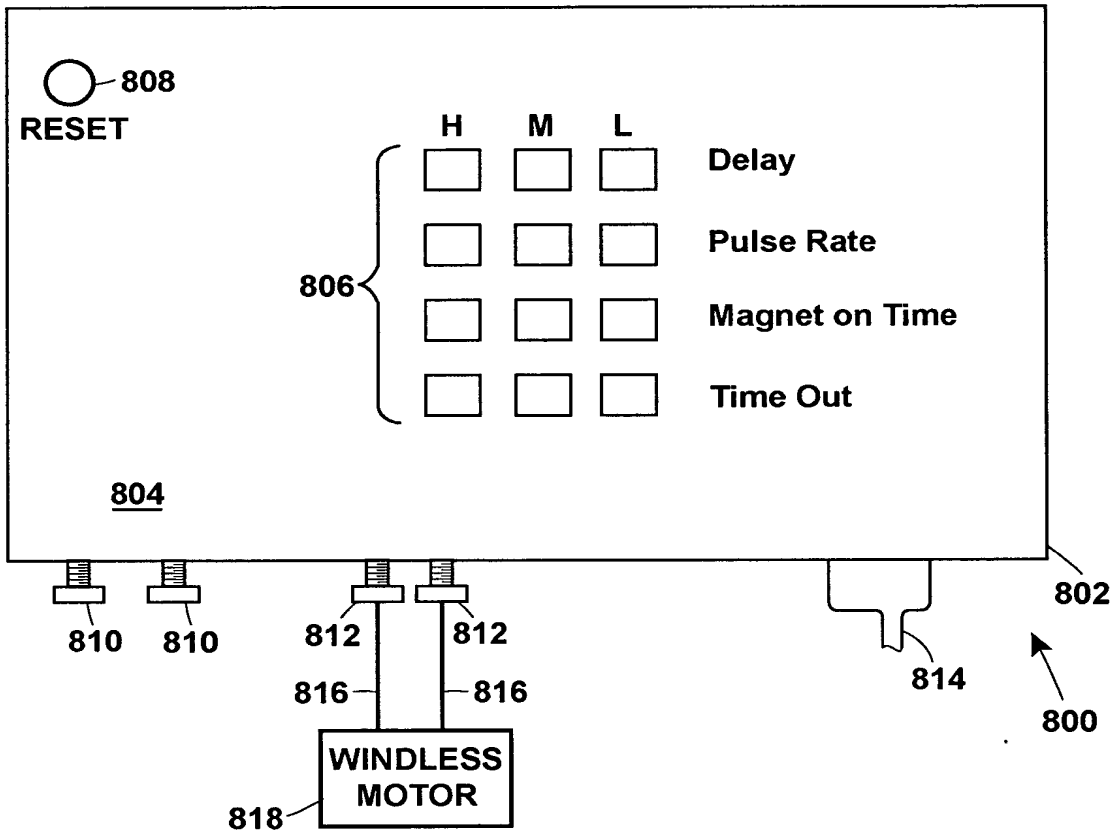


FIG. 10


808
RESET
H
M
L
Delay
Pulse Rate
Magnet on Time
Time Out
806
804
802
810
810
812
812
816
816
814
800
WINDLESS MOTOR
818